DEPARTMENT of ENVIRONMENTAL SERVICES
Water Division - Watershed Management Bureau

LAKE TROPHIC DATA

MORPHOMETRIC:

| | | | |
|---|---|---|---|
| Lake: | PENACOOK LAKE | Lake Area (ha): | 145.69 |
| Town: | CONCORD | Maximum depth (m): | 19.5 |
| County: | Merrimack | Mean depth (m): | 6.9 |
| River Basin: | Merrimack | Volume ($m^3$): | 9997500 |
| Latitude: | 43°13'52" N | Relative depth: | 1.4 |
| Longitude: | 71°35'29" W | Shore configuration: | 1.85 |
| Elevation (ft): | 400 | Areal water load (m/yr): | 2.73 |
| Shore length (m): | 7900 | Flushing rate ($yr^{-1}$): | 0.40 |
| Watershed area (ha): | 932.4 | P retention coeff.: | 0.76 |
| % watershed ponded: | 0.2 | Lake type: | natural w/dam |

| BIOLOGICAL: | | 17 February 2000 | 21 July 1999 |
|---|---|---|---|
| DOM. PHYTOPLANKTON (% TOTAL) | #1 | TABELLARIA 95% | CHRYSOSPHAERELLA 40% |
| | #2 | ASTERIONELLA 5% | TABELLARIA 25% |
| | #3 | | CERATIUM 25% |
| PHYTOPLANKTON ABUNDANCE (units/mL) | | | |
| CHLOROPHYLL-A (µg/L) | | | 3.46 |
| DOM. ZOOPLANKTON (% TOTAL) | #1 | KERATELLA 42% | NAUPLIUS LARVA 40% |
| | #2 | NAUPLIUS LARVA 26% | CYCLOPOID COPEPOD 19% |
| | #3 | CALANOID COPEPOD 19% | CALANOID COPEPOD 16% |
| ROTIFERS/LITER | | 14 | 12 |
| MICROCRUSTACEA/LITER | | 17 | 74 |
| ZOOPLANKTON ABUNDANCE (#/L) | | 31 | 86 |
| VASCULAR PLANT ABUNDANCE | | | Scat/Common |
| SECCHI DISK TRANSPARENCY (m) | | | 6.0 |
| BOTTOM DISSOLVED OXYGEN (mg/L) | | 11.5 | 4.7 |
| BACTERIA (E. coli, #/100 ml) | #1 | | < 1 |
| | #2 | | < 1 |
| | #3 | | |

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 6.9
Hypolimnion volume ($m^3$) : 2023500
Anoxic volume ($m^3$) : None

CHEMICAL:

Lake: PENACOOK LAKE
Town: CONCORD

| | 17 February 2000 | | 21 July 1999 | | |
|---|---|---|---|---|---|
| DEPTH (m) | 4.5 | 9.0 | 3.0 | 10.0 | 16.0 |
| pH (units) | 6.5 | 6.3 | 6.7 | 6.3 | 6.1 |
| A.N.C. (Alkalinity) | 5.7 | 5.5 | 5.7 | 6.0 | 5.0 |
| NITRATE NITROGEN | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| TOTAL KJELDAHL NITROGEN | < 0.10 | 0.11 | 0.20 | 0.10 | 0.10 |
| TOTAL PHOSPHORUS | 0.009 | 0.008 | 0.004 | 0.008 | 0.008 |
| CONDUCTIVITY (µmhos/cm) | 108.0 | 108.0 | 105.3 | 99.7 | 101.3 |
| APPARENT COLOR (cpu) | < 5 | < 5 | < 5 | 9 | 9 |
| MAGNESIUM | | | 0.94 | | |
| CALCIUM | | | 4.3 | | |
| SODIUM | | | 13.4 | | |
| POTASSIUM | | | 0.61 | | |
| CHLORIDE | 25 | 25 | 24 | | 24 |
| SULFATE | 6 | 6 | 5 | | 5 |
| TN : TP | | 14 | 50 | 13 | 13 |
| CALCITE SATURATION INDEX | | | 3.2 | | |

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1999

| D.O. | S.D. | PLANT | CHL | TOTAL | CLASS |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 0 | 3 | Oligo. |

COMMENTS:

1. Previously known as Long Pond.

2. This is the public water supply for the City of Concord. Fishing, swimming and boating are prohibited in this lake as well as in Russell Pond, which is tributary to the lake.

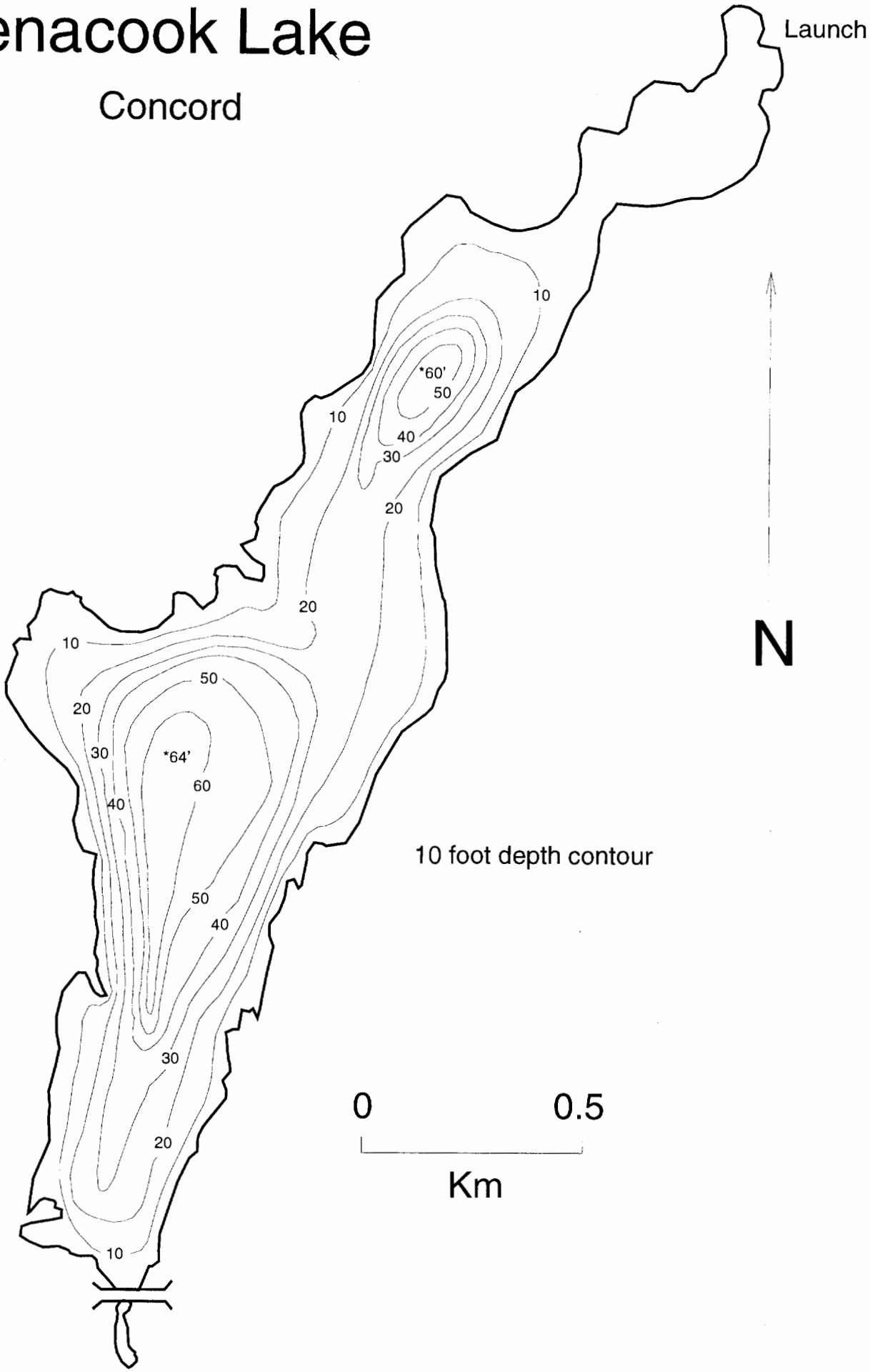
3. This is a clear water lake with relatively low primary productivity (plant and algal growth). Taste and odor algae have been a concern in recent years. Contoocook River water is pumped into the watershed of Penacook Lake to supplement the lake for water supply. Nutrients in the river water likely contribute to the algal growth. The lake was treated with copper sulfate in 1998 to control nuisance algal growth. Note: during the drought of the early to mid 1960s, Turkey River water was diverted into Penacook Lake. The lake was treated with copper sulfate in several years in the 1960s and in 1972 because of algal nuisances, likely caused by the Turkey River diversion.

4. Sodium and chloride levels suggest some road salt runoff. Conductivity values suggest these and perhaps other ions are entering the lake.

5. The lake level was down about 3 feet during the summer survey.

# Penacook Lake

## Concord



FIELD DATA SHEET

LAKE: PENACOOK LAKE TOWN: CONCORD
DATE: 07/21/1999 WEATHER: Sunny, Hot, Clear

| | DEPTH (M) | TEMP (°C) | *DISSOLVED OXYGEN | OXYGEN SATURATION |
|---|---|---|---|---|
| | 0.1 | 26.1 | 7.7 | 95 % |
| | 1.0 | 25.8 | 7.6 | 93 % |
| | 2.0 | 25.5 | 7.5 | 92 % |
| | 3.0 | 25.3 | 7.6 | 93 % |
| | 4.0 | 25.2 | 7.7 | 93 % |
| | 5.0 | 25.1 | 7.8 | 94 % |
| | 6.0 | 23.6 | 8.9 | 105 % |
| | 7.0 | 18.8 | 10.8 | 116 % |
| | 8.0 | 14.9 | 10.3 | 101 % |
| | 9.0 | 12.7 | 9.1 | 86 % |
| | 10.0 | 11.5 | 8.4 | 78 % |
| | 11.0 | 10.3 | 7.8 | 69 % |
| | 12.0 | 9.3 | 6.6 | 57 % |
| | 13.0 | 8.5 | 6.4 | 55 % |
| | 14.0 | 7.9 | 6.0 | 51 % |
| | 15.0 | 7.4 | 5.6 | 46 % |
| | 16.0 | 7.1 | 5.2 | 43 % |
| | 17.0 | 6.9 | 4.5 | 37 % |
| | 18.0 | 6.9 | 4.5 | 37 % |
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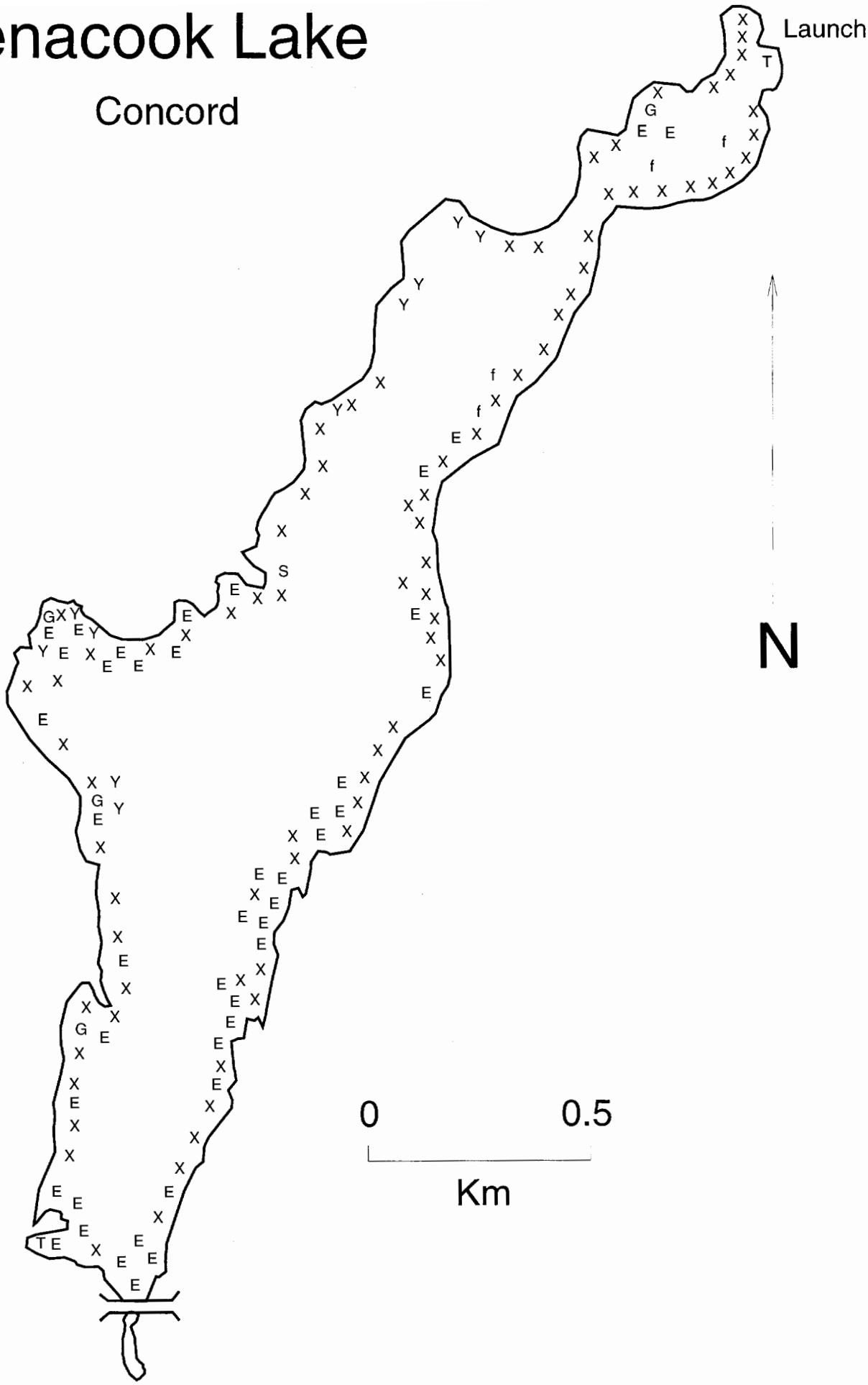
SECCHI DISK (m): 6.0 COMMENTS:
BOTTOM DEPTH (m): 19.0
TIME: 1230

*Dissolved oxygen values are in mg/L

# Penacook Lake

## Concord



# AQUATIC PLANT SURVEY

LAKE: PENACOOK LAKE TOWN: CONCORD DATE: 07/21/1999

| Key | PLANT NAME | | ABUNDANCE |
|---|---|---|---|
| | GENERIC | COMMON | |
| X | | Sterile thread-like leaf | Common |
| f | | Filamentous algae | Sparse |
| E | Eriocaulon septangulare | Pipewort | Sparse |
| Y | Nuphar | Yellow water lily | Sparse |
| G | Gramineae | Grass family | Sparse |
| S | Sparganium | Bur reed | Sparse |
| T | Typha | Cattail | Sparse |
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OVERALL ABUNDANCE: Scat/Common

GENERAL OBSERVATIONS:

1. Rocky shoreline; rooted plants were sparse, probably because of rocky substrate and fluctuating water levels.
2. Non-flowering, low growing, thread-like bottom growth was common along most of the shoreline.
3. An eagle was observed.